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ABSTRACT

This study describes four developmental stages of Training and Technology (TAT), a human resources development activity begun 7 years ago by the Oak Ridge Associated Universities for the U. S. Department of Labor. The first year's project, in 1966, surveyed manpower development and training in universities, industry, and government in 15 Southern states. The following 2-year demonstration project was designed to train underemployed workers in area vocational schools for existing jobs and to update the preparation of vocational and technical teachers. The teacher training program became a regular University of Tennessee program that continued to use TAT facilities for course credit. The third project, beginning in 1969, concentrated on training disadvantaged persons with a training model developed for use in industrial facilities. The fourth developmental stage, beginning in 1972, involved an assessment of all past TAT experience, including a survey of post-placement TAT graduates, and inauguration of a regional utilization network workshop to explore new ways of applying TAT's research in manpower development skills. (MF)

TRAINING AND TECHNOLOGY

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Major Stages of Development

1966 A Resource Study for Southern Manpower Development

1967–68 Action Research in Training for Vocational-Technical Teachers and the Underemployed Worker

1969–70–71 Development and Testing of a Model Industrial/Education Partnership to Provide the Disadvantaged with Quality Training for Quality Jobs

1972 TAT Becomes Oak Ridge Associated Universities Manpower Development Program of Industrial Skill and Technical Training and Manpower Research and Development

October 1972

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I. INTRODUCTION

TAT's major stages of development provide a frame of reference for the accumulated TAT experiences in human resource development and will respond to a Department of Labor assessment study of the Experimental Manpower Laboratory concept. This study under the auspices of the National Academy of Sciences is to focus on the performance of four formally designated Experimental Manpower Laboratories and related R&D projects including TAT.

As a human resource development activity, TAT has literally had seven years of programs and not seven years of the same program. The TAT concept has a manpower development approach that: (a) is multi-organizational, (b) uses industrial technology and other existing resources, (c) has flexibility to consider and use alternative methods, techniques and procedures, and (d) is engaged in manpower research and development.

In each of the following sections, which cover our first three stages of development, there is a brief introduction, a tabulation on funding sources and amounts and an abstract of significant activities. The fourth stage which began this year is a reflection of work in progress under a changed organizational structure that gives more recognition to manpower research and development. The calendar year designations reflect the time span and ending dates for each development stage. The bibliography included for each stage is descriptive of the activities that occurred during the period regardless of the publication date.

1966

II. A RESOURCES STUDY OF SOUTHERN MANPOWER DEVELOPMENT

This one-year project was the initial effort by Oak Ridge Associated Universities (then called Oak Ridge Institute of Nuclear Studies) for the U. S. Deaprtment of Labor. This study was made by a staff of professionals who visited with those involved in manpower development and training in universities, industry, and government in 15 Southern states.

The survey report was published and has been widely distributed. The stage was also set for the next major development of Training and Technology with the negotiation and funding of the TAT Manpower Training Demonstration Project for teachers and workers. The survey report summary is reprinted below.

PROGRAM SUMMARY

This report is about millions of Southerners who are unable to make reasonable use of their potential for work mainly because of inadequate education and training. They have no work, insufficient work or work at pay levels below the poverty line. Estimates of the number of these people in the 15 Southern states from Maryland to Texas range from 5 million to 10 million, depending on the criteria for selection. Many of these millions in need of special training live in rural areas and a very large number are Negroes.

The resources in the South for providing manpower training and development programs are not yet being fully applied to the problem. Existing programs for manpower training accommodate only a few thousand each year. These programs, many of them recently developed, are moving in the direction of relieving the manpower problem; however, they must be greatly expanded and need more funds, more qualified personnel, more support and assistance from other institutions and more efficient use of existing knowledge and experience. In addition, new programs are needed in areas not fully served by existing agencies.

A comprehensive plan for the training of the underdeveloped manpower of the region requires the inclusion of all resources – state agencies, federal programs, universities and colleges, business and industry and citizen groups. Particular attention must be given to the prevention of additional manpower problems through improvements in our basic educational system. These will require more money for schools, better guidance and counseling of young people, and curriculum changes reflecting needs for vocational education as well as academic preparation.

Attention is also needed to the upgrading of employees to the high skill positions which are going unfilled for lack of qualified personnel. This means a greater commitment on the part of government and industry to train people with capabilities to their highest potential, whether they are employed or unemployed. Special efforts in all of manpower training programs are needed to overcome the cultural and traditional barriers that have inhibited the development of the Negro population.

This report recommends activities designed to provide needed support to those institutions and programs responsible for manpower development efforts. Colleges and universities and industries in the region are considered especially important resources that are not fully utilized in supporting manpower development. Collaboration between these institutions and manpower training agencies can result in greatly improved and expanded manpower development. No one program will solve the manpower problems of the region. Each program and each institution has a particular contribution to make. It is the combination of efforts and the relationships between institutions that will produce significant advances in the development of human resources in the South.

	Dates & Agency	Research & Development
FUNDING	1965-1966, Department of Labor	$ 87,000

PUBLICATIONS *Resources for Southern Manpower Development*, 1965. *Proposal, Training and Technology, A Manpower Training Demonstration Project*, 1966.

1967 - 1968

III. ACTION RESEARCH IN TRAINING—VOCATIONAL-TECHNICAL TEACHERS AND UNDEREMPLOYED WORKERS

This two-year demonstration project was designed to train underemployed workers for existing jobs and to update the preparation of vocational and technical teachers. The goal was to begin the development of a method of industrial-university-government cooperation in the use of existing resources for manpower development and training.

During these two years, several different groupings of workers and teachers received flexible, individualized training that made intensive use of the industrial training resources of the Atomic Energy Commission Y-12 Plant operated under contract by Nuclear Division, Union Carbide Corporation.

The action research design anticipated that a two-year operating period would enable the project to capitalize on the first year's experience during the second year and improved training programs of shorter duration were the result by the end of this TAT development stage.

PROGRAM SUMMARY

Major Accomplishments of Worker Training and Experimentation Components

1. **Three types of job instruction programs were conducted for 689 persons.**
   A total of 343 received all their job training at TAT, 182 completed the joint TAT-area vocational school training program, and 164 completed the 12-week summer pilot program.

2. **Of graduates available for employment, nearly all were placed in jobs with beginning wages of almost $6,000 per year.**
   The project graduated 525 persons from three types of job preparation programs and, through the assistance of a full-time placement staff member, 473 were placed initially in jobs. Another 22 returned to area schools to complete their training and 17 were drafted. Of the 164 completing the summer preparation program for TAT Phase II, 117 were selected for full-term occupational training. A series of seminars in industrial careers preceded placement activities and contributed to placement success.

3. **Recruitment netted 5,000 applications for skill training.**
   Nearly 3,100 persons applied for full-term TAT training. Three hundred applications were received for the joint TAT-area school courses and more than 1,600 applied for the 1968 summer pilot program and TAT II worker training.

4. **Curriculum was developed in six occupational areas.**
   Forty-two-week courses were developed in machining, mechanical drafting, physical testing, industrial electronics, and glass blowing, and a 21-week course in welding. Fourteen-week courses for advanced students in area vocational schools were developed in mechanical drafting, machining, and industrial electronics. A 12-week basic job preparation program was developed in machining, welding, physical testing, and electronics.

5. **TAT worked closely with the Tennessee Division of Vocational-Technical Education to link Division activities more closely with industry and industrial technology.**
   In addition to development, operation, and analysis of a joint 14-week training program in industrial job skills for advanced students in area vocational schools, TAT and the Division co-sponsored a Vocational Education and Industry Conference for 100 educators and industrial representatives, a conference for area school guidance personnel, and one-week visits to the TAT project for 60 division staff members, area school administrators, and assistant administrators. There were two joint publications.

6. **Organized Labor Actively Participated in TAT Activities.**

Five units of organized labor contributed to the training and evaluation of trainees, conducted trainee seminars on the role of organized labor in industry, participated in program evaluation panels and special conferences, and served on the Project Advisory Committee.

7. **The project made special efforts to recruit and train Negroes, and developed methods applicable to increased Negro participation in TAT Phase II.**

A total of 116 Negroes were recruited for TAT I, 81 of whom completed their courses. Of the 164 persons in the 12-week preparation program for TAT II, 87 were Negroes, 60 of whom were selected for entry into TAT II along with 20 others from various sources.

8. **Union Carbide participation in the training program led to increased Y-12 job-training capacity.**

More than 120 Union Carbide employees were involved in TAT in instructional or supervisory positions. The company found TAT to be an excellent way to increase and upgrade its in-plant training staff. It has developed training methods through the TAT program which it considers superior to in-plant programs conducted previously.

9. **TAT worked closely with the Tennessee state employment service in expanding the concepts and techniques for meeting employment problems through development of people for jobs.**

The Tennessee Department of Employment Security performed a key role with the TAT staff in recruiting and processing 5,000 applicants, in services to trainees, and in job placement. A two-day conference on manpower development and training was held in Oak Ridge by the TAT staff and state, district, and local staff members of TDES. There was a joint staff appointment between TAT and TDES, and the project actively participated in the CAMPS (Comprehensive Area Manpower Planning System) with the employment service.

10. **The project developed a continuing program of guidance, counseling, and supportive services for trainees.**

Staff of the Educational Psychology Department of the University of Tennessee assigned to TAT identified special characteristics of the vocationally oriented student and developed improved techniques for meeting trainees' needs. The counseling staff also refined tests and testing methods for recruitment and placement of trainees within the program. A variety of specialized techniques aimed at achieving maximum attendance of trainees was developed. Services included transportation, housing, part-time work, debt management, and counseling on personal problems and family relationships.

11. **A program of training experimentation and related research was operated in cooperation with University of Tennessee faculty and graduate students.**

Faculty members and students in the Department of Industrial Management and the Department of Educational Psychology conducted and reported studies in the areas of trainee selection, trainee characteristics and performance, and criterion measurement. A number of master's degree theses resulted from these activities, a project data bank was established, and dropout and other follow-up studies were made. Increased University interest in manpower problems was generated.

12. **A professional manpower staff was developed.**

During the 28 months of operation, TAT built a staff with expertise in program development, recruitment, supportive services, guidance and counseling, instruction, job placement, information dissemination, and management and administration of manpower

programs. This provided a capability for technical assistance to other organizations concerned with manpower development.

13. **Dissemination of project findings occurred through conferences, publications, speaking engagements, and provision of technical assistance.**

Six conferences were held for industry, vocational education, employment service, guidance and counseling, and research design personnel. Seminars were held for Vanderbilt University graduate students in economics. More than a score of speaking engagements were filled by project staff members before professional and civic groups. More than 10,000 individual mailings of project publications were made to people in the manpower field throughout the country. Thirty-five news releases were prepared on project activities and more than a dozen feature articles were published in trade and industrial publications and newspapers. Television and radio coverage was given to graduation ceremonies and special TAT conferences. More than 30,000 promotional brochures were circulated and 530,000 flyers were distributed throughout Tennessee for recruitment of trainees.

14. **The project staff contributed to the development of programs continuing and expanding upon the Training and Technology experience.**

The TAT II Worker Training Project and TAT II Experimentation and Demonstration Project were developed to apply project training experience to the preparation of increased numbers of disadvantaged and minority trainees for industrial jobs, and to record, report, and expand upon project findings. The 12-week experimental pilot summer program of basic job preparation was developed by TAT as a major recruitment device for TAT II.

TAT Demonstration Findings

- A huge reservoir of trainable but underdeveloped manpower is present in our society that will respond positively to an opportunity for high-quality training. A large number of job openings exist in skilled and technical positions for people with appropriate training.

- A combination of resources that emphasizes superior performance and advanced technology has direct application in developing the unrealized potential of our human resources. This approach cuts across the entire manpower development problem, encompassing those people who are severely disadvantaged as well as those who are mildly underemployed.

- Organizations and institutions joining forces in a comprehensive program gain knowledge and skills that extend well beyond the scope of the specific program. Industry can improve and enlarge its own training resources, job training can become a joint industry-vocational education effort, and job placement can be integrated properly with recruitment, selection, and training, all as part of the total employment process.

- The solution of difficult and complicated manpower training problems can be accelerated by the application of a high degree of management and administrative competence and, under proper management influence, the facilities, personnel, and technology of advanced industrial organizations can be redirected and effectively applied to the operation of quality training programs.

- The slightly higher costs per man of this advanced skill and technical training are more than compensated by the higher salaries received by graduates placed on career jobs in industry and the resulting increase in income tax payments realized by the Federal Government.

A second major area of work during this period was the TAT Experimental Research Program for Vocational-Technical Teachers. One of the problems which fell within TAT's mission of exploring multi-organizational approaches to human resources development was that of meeting the rapidly increasing demand for qualified vocational-technical teachers. To begin with several problems were identified as crucial: (1) The escalation of required skill and technical knowledge needed in industry has outmoded program concepts and teacher resources. (2) New skills and technical knowledge require more advanced general education levels as prerequisites. (3) Industrial demands for skilled and knowledgeable workers tend to drain educational institutions of teaching talent. (4) Advanced technical processes require expensive and often unavailable equipment for effective teacher training, and such equipment is increasingly less available in schools for this purpose.

TAT's Experimental Research Program for Vocational-Technical Teachers undertook, through a Vocational-Technical Teachers Institute, to demonstrate that vocational education and industry could work closely together to prepare and update teachers quickly and efficiently in modern industrial technology.

The experiment developed and demonstrated: (1) ways to bring vocational instructors in selected occupational areas as close as possible to current industrial practices, (2) ways to recruit and prepare persons for vocational teaching in an industrially oriented atmosphere, and (3) methods, principles and procedures to stimulate development of similar ongoing programs.

FUNDING

Dates & Agency	Industrial Skill & Technical Training	Vocational Teachers Training	Research & Development
1967-1968			
Department of Labor	$1,654,758*		$302,831
USOE Bureau of Research		$456,389*	

*Includes subsistence allowances.

PUBLICATIONS

TAT Worker Training Curriculum, 1967-1968, 1969

TAT Worker Training Catalog, 1971

Recruitment 1966-1967 Worker Training Program, 1967

Organized Labor's Participation in a Training Experiment, 1968

TAT Industrial Conference Proceedings, 1968

Developments Related to February 1967 Evaluation Conference, 1967

Analysis of TAT Dropouts, 1967

Final Report, The Training and Technology Project Experimental Research Program for Vocational-Technical Teachers, 1968

Tennessee State Board for Vocational-Technical Education, *Visitation Program Report of Training and Technology Project*, 1968

Tennessee State Board for Vocational-Technical Education, *Summary Report of School-Industry Conference*, 1967

Training and Technology, A Demonstration Manpower Project, Worker Training Program, Phase I, Final Report to the Department of Labor, 1969

Course Outlines, 1967 In-Service Teacher Institute, 1967

Machining and Production Machining Operations Curriculum, 1968

Theses

Grove, B., *A Factor Analytic Study of Mechanical Drafting*, 1968

Degli, D., *A Questionnaire Approach to an Analysis of the Training Needs of Mechanical Draftsmen*, 1967

Guerra, J., *A Study of the Interrelationships Between the Self-Image Self-Ideal Discrepancy Ability, and Achievement with Vocational Subjects*, 1967

Lyon, W., *Validity of Some Test of Intellectual Ability for Predicting Grades in Related Craft Training*, 1968

Terry, P., *The Use of Biographical Information in Predicting Success in a Vocational-Technical School*, 1968

Thoresen, J., *The Effects of TAT on GATB Scores*, 1968

1969-1970-1971

IV. DEVELOPMENT AND TESTING OF A MODEL - QUALITY TRAINING FOR QUALITY JOBS

Early in this stage of TAT's development, the teacher training program spun off to be a regular University of Tennessee program that continued to use TAT facilities for resident course credit. Industrial Skill and Technical Training for the disadvantaged then became and has remained a central focus for TAT. The training model is an industrial/education partnership where industry trains in its own facilities for its own needs and the needs of others (see Figure 1 for the TAT model).

Project management has consciously made use of a system approach that places training in the center of the total employment process of recruitment, selection and placement in training—skill and technical training, trade-related instruction and supportive services—job preparation training, job development and placement, and followup and feedback.

TAT's manpower development and research experience for this three-year period is abstracted below under the headings of people, training, and jobs.

PEOPLE

The Worker Training program extended its coverage to a broad cross section of the South's and nation's underemployed manpower. Beginning in 1969, trainees were recruited primarily from the ranks of the disadvantaged (81 percent) as contrasted with the previous years when trainees were largely underemployed or economically disadvantaged but generally possessed stronger educational backgrounds. Trainees selected have been representative of many segments of the nation's youthful (average age 23) population: men and women (about 6 percent); urban, rural and mountain regions in seven states and minority representation averaged 40 percent predominantly blacks with a few American Indians and Mexican-Americans.

One example of this population coverage is the Satellite Training Project which began early in 1969 when 24 young, untrained blacks from Chicago's southside ghetto were given training at Oak Ridge, which demonstrated that relocation of ghetto residents was a feasible approach to three problems: job training, providing skilled labor for industry located outside the nation's urban areas, and alleviating unemployment in the black, core city areas.

A second extension occurred with the involvement of the Appalachian Regional Commission (ARC) in a multi-state manpower training program, which demonstrated that disadvantaged residents of the central Appalachian hard-core counties of Kentucky, Virginia, West Virginia and Tennessee can be trained for quality industrial jobs at a central training facility. The Tennessee and West Virginia Work Incentive Programs also sponsored trainees in the TAT program.

A further broadening of the TAT Worker Training program resulted from the participation of the Chattanooga and Tennessee Rural Concentrated Employment Programs.

Due to national priorities in 1971, the emphasis on recruitment shifted to veterans for enrollment in the AEC Industrial Training Center. TAT was approved for veterans benefits by the Veterans Administration in June 1971, and Appalachian Regional Commission sponsored trainees were the first to receive veterans subsistence allowances.

FIGURE 1.

Training
and
Technology

Oak Ridge Associated Universities
Nuclear Division,
Union Carbide Corporation

A NEW MODEL FOR SKILLED AND TECHNICAL TRAINING

Illustrated opposite is a model for skilled and technical training based on TAT experience. The model is multi-organizational, possesses flexibility and requires a management concerned with coordination, that is a catalytic agent for experimentation and research and acts as an independent agent for the achievement of program objectives. Model characteristics are:

Flexibility is a management requirement, facilitates coordination, and is a necessity for the adjustment of occupational training to the accelerating change of industrial technology.

Management provides the necessary framework for the structure–coordination and direction that assures achievement of objectives. In TAT, it has been ORAU and Nuclear Division, Union Carbide Corporation; in other situations it would be other educational organizations.

1. ↓ 12.

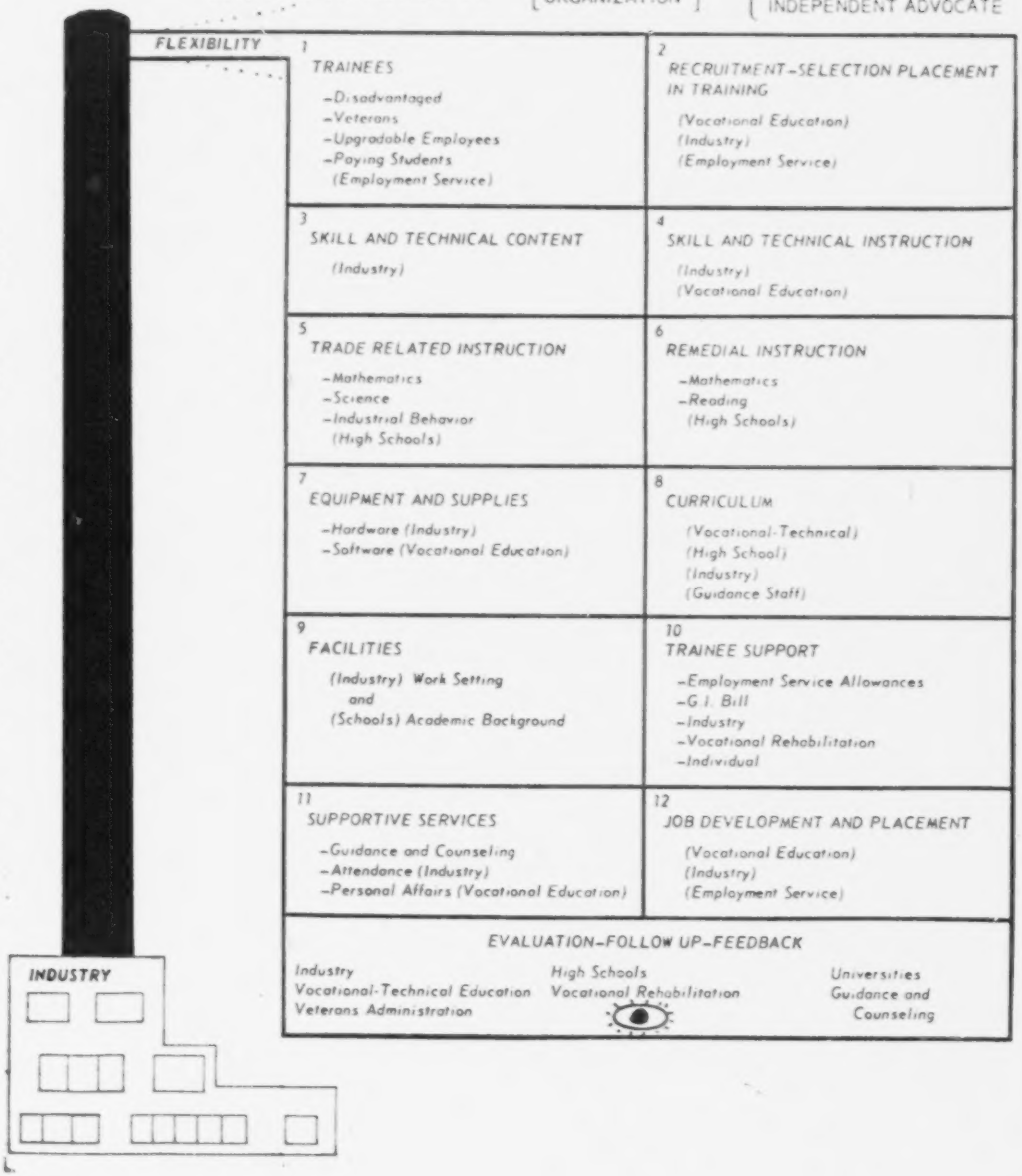
The 12 Program Elements are essential for a comprehensive program for training the disadvantaged, should be under unified management and need to be conducted by several different manpower agencies in a coordinated cooperative manner.

The campus for vocational education must include the industrial community within its boundaries because the work setting has the genuine models for instruction and training.

The objective is to train the disadvantaged with sixth grade achievement level in mathematics and reading for jobs paying more than $6,000 per year in six months.

Evaluation–Follow up–Feedback needs to be related to all program elements, requires input from all participating organizations and is important for program flexibility and improvement.

These activities should be structured to provide for balanced representation among interested parties, use of alternative methods and maintenance of reporting schedules.



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TRAINING

Training and Technology skill and technical training began the transition from an experimental to a special type of regular MDTA program in its third year. Funding shifted from that provided solely by the U. S. Departments of Labor and Health, Education and Welfare under the Manpower Development and Training Act, to one which included substantial financial support by other federal as well as state and local agencies.

Guidance and counseling, previously performed by University of Tennessee graduate students, became a staff function in TAT's third year. The governing aim of the guidance and counseling program was to focus on present trainee needs, with major emphasis on educational and occupational counseling.

Training was open-ended with placement into jobs as soon as trainees acquired entry level skills; that is, a trainee has shown he is responsive to shop instruction, can adapt to an industrial environment and can compete in the plant in his primary skill area. Graduates were replaced immediately with other trainees, producing far more graduates than the funded 190 slots at the beginning of the training year, thus permitting maximum use of training resources and lowering per trainee costs. Where previous cycles had required 52 weeks, then 42 weeks, training time by 1969 averaged 26 weeks (see Figure 2 for curriculum).

A Study of Trainee Attitudes Toward the Worker Training Program sought to uncover what generally pleased and displeased trainees at TAT.

The success of the Satellite Training Program in 1969 had several effects on TAT programs in 1970. Immediately, one result was the sponsoring of 20 training positions in 1970 by AEC contractors, the National Accelerator Laboratory and Argonne National Laboratory. A second result was the beginning of the AEC Industrial Training Center in which the AEC, Department of Labor and TAT would jointly develop a comprehensive, coordinated training program for disadvantaged persons leading to employment within the U. S. Atomic Energy Commission employment network. This AEC Industrial Training Center became a reality in October of 1971 with the enrollment of 208 trainees in the October training cycle. A total of 88 regular and 34 upgrading trainees were sponsored by four AEC contractors—NAL, ANL, Goodyear Atomic Corporation and Nuclear Division, Union Carbide.

Documentation and dissemination took on a variety of forms over the 1969-1971 period. A number of publications were produced which document the various activities of TAT, its findings and capabilities. The list of publications below gives the most significant of those publications.

Personal contact methods of dissemination—workshops, conferences, meetings, visits, and visitors—were significant means of transmitting information concerning the TAT experience with manpower development. The JOBS Conference in 1969 sponsored by TAT and the Department of Labor in association with the National Alliance of Businessmen is representative of this type activity.

JOBS

TAT has consistently placed a high percentage of its graduates in well-paying jobs in industry as is reflected in Figure 3 on the following page.

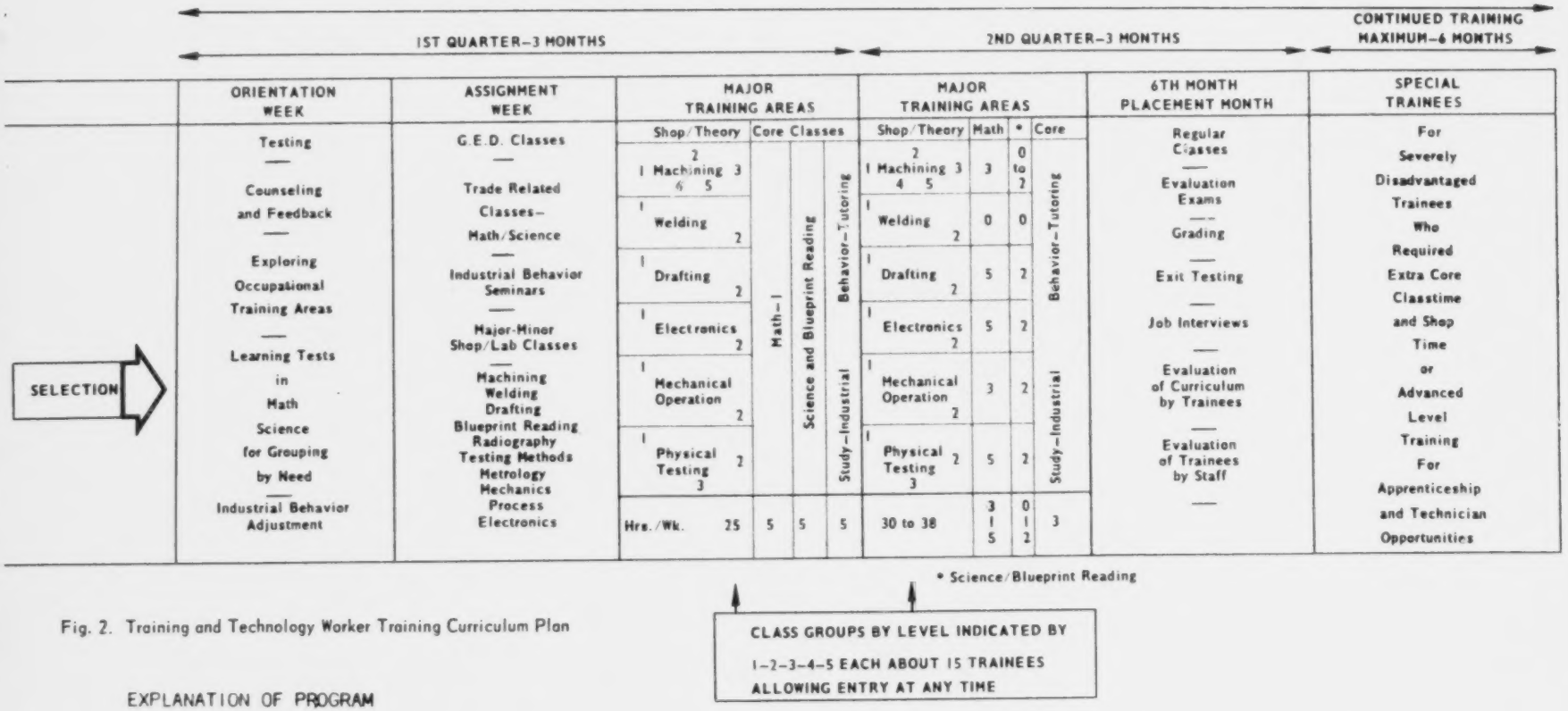

Fig. 2. Training and Technology Worker Training Curriculum Plan

EXPLANATION OF PROGRAM

TAT industrial plant job training differs from most training programs in several respects. It is basically six months in duration, preparing entry-level, skilled Industrial Technician Aides through a combination of trade-related and shop training in an industrial plant, in the presence of regular industrial workers and with skill instruction and supervision by experienced journeymen and industry supervisory personnel. Trainees work with industrial equipment in the shop or lab, toward industry specifications and requirements for skilled plant workers. The programs of study are specifically designed to broaden the trainee's trade experience and to meet industry's increasing demand for versatility, so that a "major" and a "minor" are an integral part of his preparation for better job opportunities and career advancement. He is, of course, both reported and primarily trained under his "major" DOL job classification.

As indicated by the above course outline, there are different levels of training and progression in each basic occupational training area. But there is no inflexible, mass-unit outline which all individuals must follow: a given trainee may, with proper approval and reporting, move between various sub-areas, concentrate on particular sub-skills or related skills, etc., depending on his aptitudes and job development needs.

The average trainee's course of study and training totals 1,040 hours. Generally, the 40 hours per week include 75% concentration on occupational training (skill) theory, lecture, and practice in the laboratory or shop, with the balance devoted to trade-related instruction in math, science, communications and industrial behavior, and any needed remedial services or general education development.

Evaluative methods include: regular attendance records, occupational counseling sessions, written tests, shop/lab performance, periodic review, individual assignments, and grading.

Figure 3.	1966-68	1969	1970	1971
Employed at entry into TAT*	58.2%	27.7%	29.6%	38.4%
Average wage before entry	$2126/yr	$936/yr	$1061/yr	$1453/yr
Average starting wage on initial job after graduation	$5928/yr	$6302/yr	$6427/yr	$6540/yr
Increase of post-TAT wage over pre-TAT wage	$3802/yr	$5366/yr	$5366/yr	$5087/yr
Employed in at least one job since graduation	99.3%	97.4%	94.3%	95.3%

*Includes part-time and temporary employment.

Included in the figures above are the placement results for two of the groups previously mentioned which can be cited as more specific examples of placement. Of the 145 trainees sponsored by the Appalachian Regional Commission, 88 percent were placed in jobs averaging more than $3.00 an hour. Approximately two-thirds of this group were unemployed prior to TAT training. The Satellite Project trainees had a similar placement experience. All 22 graduates of the project returned to NAL, with a starting wage of $3.00 an hour; review a short time later resulted in pay raises averaging six percent. *A Cost-Benefit Study* of the TAT Worker Training program as a whole revealed that TAT graduates had a first year return to better than 200 percent in earned income over what it cost them in earned income ($1,322) to undergo training. For each dollar of income lost to the trainee, he received $2.60 during his first year of post-training employment. A second finding was that the Federal Government had a 20.5 percent annual rate of return (assuming a three percent annual rate of worker income growth), and a 25.7 percent rate of return (assuming a six percent rate of income growth), on its investment in TAT.

A measure of the flexibility and broad scope of the TAT Worker Training is the fact that graduates in the six training areas have been placed in better than 170 different job classifications, in more than 60 major industries across the nation.

FUNDING

Dates & Agency	Industrial Skill & Technical Training	Research & Development
1969-1971 Department of Labor	$1,143,381*	$647,722
Atomic Energy Commission (Oak Ridge)	$1,123,243	
Atomic Energy Commission (Chicago)	$122,427*	
Appalachian Regional Commission	$427,742*	
CEP's	$606,362*	

*Includes subsistence allowances.

PUBLICATIONS

Approaches to Prevocational Trade-Related Subjects, 1969

Benefit-Cost Analysis of TAT Phase I Worker Training, 1969

Characteristics of the Worker Training Graduate from Appalachia, 1970

Continuance of an Institutional MDTA Program Through a Prolonged Strike, 1970

Developing Technical Skills for Black Trainees in a Worker Training Program, 1970

Development of Human Potential, 1969 Annual Report to Department of Labor, 1970

The Effects of a Manpower Training Program on the Personal Lives of Its Graduates, 1970

An Evaluation of the Appropriateness of Standardized Tests Presently Administered to TAT Worker Training: A Preliminary Report, 1970

General Catalog for Training and Technology, 1971

General Education Development (GED) Program at Training and Technology, 1970

Job Development Counseling and the Black Trainee, 1970

Machine Shop Theory and Practice, 1969

Manpower Development Services, 1971

Mechanical-Engineering Technology Curriculum, 1969

Mechanical and Process Operations Curriculum, 1971

Physical Testing Technology Curriculum, 1969

Preparing Rural Appalachians for Skilled and Technical Jobs: A Regional Approach, 1971

Remedial Reading in a Manpower Training Program, 1971

Satellite Training Project with the National Accelerator Laboratory, 1970

Selection Research: Lesson in the Development of a Work Sample, 1971

A Study of Trainee Attitudes in a Manpower Training Program, 1970

Technical Training for the Disadvantaged, 1969

"Technicians: How to Grow Your Own," in *Manpower* magazine, 1970

Testing Procedures for the Disadvantaged, 1970

Tour - Test - and Interview: A Model for Recruitment of Disadvantaged Persons into a Manpower Training Program, 1970

Training Central Appalachians for Skilled Jobs, 1970

Training Welfare Recipients in Industrial Skills: A Study of Tennessee and West Virginia Work Incentive (WIN) Enrollees at Training and Technology, 1972

University Participation in Manpower Training Through Manpower Research Activities, 1972

University Resources and Industrial Manpower Development, 1971

Use of Volunteers in a Manpower Development Program, 1971

Theses

Alfano, A., *Analysis of the Attitudes of the Unemployed Toward Work and the Development of an Employment Readiness Scale to Measure These Attitudes*, 1972

Cohen, S., *Investigation of the Utility and Effectiveness of Simulation Techniques in the Evaluation of Disadvantaged Persons for Supervisory Potential*, 1971

Collins, W., *A Proposal Check List Measure of the Interpersonal Competence*, 1971

Daffron, W., *Comparison and Evaluation of Mathematical Performance by Blacks and Whites as Measured by the California Achievement Tests*, 1971

Petty, M., *Relative Effectiveness of Different Methods of Formal Communication*, 1970

Scott, R., *Application of Porter and Lawler's Attitude-Performance Model to a Population of Disadvantaged Trainees*, 1971

Troop, P., *An Analysis of Trainees at the Training and Technology Project Who Transfer to a Second Training Area*, 1970

Umberger, O., *A Study of the Development of Competency in Mathematics as a Function of Training Received at a Manpower Development Project*, 1971

Wright, O., *Differential Rates of Success of Trainees With and Without Criminal Records in the Training and Technology Program*, 1971

University Research Studies

Bennett, D. and Brown, D., *Existing and Forecasted Employment in Selected Service Occupations (East Tennessee)*, 1970

Cohen, S., *Perceived Knowledge of Pre-Trainees on Job Characteristics*, 1970

Gordon, M. and Scott, R., *Evaluation of a Manpower Development Project in Terms of Its Effects on the Personal Lives of Its Graduates*, 1970

Overman, R., *Identification of Potential Training Resources for Service Occupations (East Tennessee)*, 1970

Rubin, G., *An Ipsative Approach to the Prediction of Trainability*, 1970

1972

V. ORAU MANPOWER DEVELOPMENT PROGRAM

January 1972 marked the beginning of the fourth stage of development for TAT. The goals can be given, the work in progress can be summarized, but it is too soon for any final results and achievements to be documented or demonstrated. Operating responsibility for the Industrial Skill and Technical Training program remains, but this development stage is characterized by the major emphasis placed on manpower research and development activities.

Those activities can be divided into four areas all more or less equal in effort: (1) Assessment of all past TAT experience directed at identification of findings for purposes of utilization. Included here is a *Survey of Post-Placement Experiences of TAT Graduates*. (2) Application and extension work directed toward the Industrial Skill and Technical Training program to achieve its use in whole or in part within the AEC system, private industry and manpower agencies. (3) *Upgrading in an Industrial Setting*, an exploratory research and experimentation effort to learn about upgrading practices in large corporations and ways in which they might be changed. (4) New developments involving active exploration of the most logical and promising prospects for the application, extension and utilization of TAT's research products, experience finding and manpower development skills. Work in this area has started with the concept of developing a Regional Utilization Network which was formally inaugurated at a workshop in mid-September.

PROGRAM SUMMARY OF WORK IN PROGRESS

Industrial Skill and Technical Training

This program trains disadvantaged for AEC contractor jobs, provides skilled and technical training for veterans and upgrades industrial employees. It is based on five years of demonstrated accomplishment that federal agencies—Atomic Energy Commission, Department of Labor, Department of Health, Education and Welfare working with the TAT organization and in cooperation with state and local manpower agencies can train the disadvantaged for skilled and technical jobs common to many large industries.

TRAINING THE DISADVANTAGED FOR AEC CONTRACTOR JOBS - The present TAT Worker Training program is operated as an AEC Industrial Training Center serving primarily the AEC contractor system in Eastern United States and is funded as a national program by the Department of Labor, Department of Health, Education and Welfare, and AEC contractors. Skilled and technical industrial aides are prepared for a wide range of entry-level industrial career jobs in machining and inspection; technicians in electronics, physical testing, chemistry and drafting; and the mechanical trades in combination welding, mechanical and process operations.

SKILLED AND TECHNICAL TRAINING FOR VETERANS - In accordance with urgent national priorities, training was provided this year for 200 veterans with training costs provided through a combination of national MDTA funds and GI benefits. Full range of Center training and supportive services are applied to prepare veterans for industrial careers.

UPGRADING INDUSTRIAL EMPLOYEES - This new activity is to be operated as a part of the Worker Training component above. Over 100 industrial employees of AEC contractors will participate. This comprehensive upgrading activity includes training in production skills for skilled and technical entry jobs.

ADD-ON'S - Provision is also made for enrollment of trainees from other manpower training programs up to the capacity of the Y-12 Plant—approximately 100 additional trainees. Included would be Work Incentive (WIN) enrollees, Concentrated Employment Programs (CEP), and individual referrals from state manpower agencies.

Research and Development

Assessment

TAT accumulated experiences and documented activities over the past six years are being analytically assessed for purposes of utilization. The areas of assessment are:

- Worker Training
- Government Contractors
- Industrial Applications
- Regional Manpower Development
- University Relations
- Manpower Agency Relationships
- Training in Manpower Development

Specific examples of assessment activity are described below.

POST-PLACEMENT SURVEY - The main objective of a *Survey of Post-Placement Experiences of TAT Graduates* is to carry out a more thorough investigation of the "post-placement" period to gain in-depth information concerning the problems faced by TAT graduates in adjusting to regular employment and related community life. This is to provide an empirical basis for program improvement and development to remove or alleviate adjustment difficulties.

WELDING STUDY - An analytical assessment of TAT welding program will prepare a statement of facts and conclusions summarizing TAT's experience and research in training welders that could have external validity in other MDTA sponsored welding programs.

ASSESSMENT OF CURRENT TRAINEES - The objectives of these studies of veterans, high school students and law offenders are: (1) To determine the degrees of similarity or difference in the training performance of veterans, high school students and law offenders. (2) To determine what influence participation in TAT has on work attitudes and values among high school students and law offenders. (3) To identify and document areas of conflict between program operations [e.g., policies, teaching methods, curriculum, etc.] and individual trainee needs. (4) To identify elements, factors, or components in the TAT program which are perceived to be reinforcing to participants in helping maintain learning behaviors.

EXPERIMENTATION AND RESEARCH - The Industrial Skill and Technical Training Center serves as an experimentation and research site for both university experimentation and continuing assessment and analysis by TAT professional staff. The objectives of Industrial Skill and Technical Training experimentation and assessment are: (1) To improve the existing training program. (2) To expand knowledge in the field of human resource development. (3) To influence improvement in other training programs. Means to accomplish these objectives are: (1) Identification of training elements essential to success for a variety of trainee populations. (2) Facilitating use of the training program as a source of research data for industrial, educational and other manpower agencies. (3) Critical analysis of training center components. The data bank is a major research tool for the organization and selection of data on TAT trainees for: (1) use by researchers and program analysts in their respective studies and (2) use by Worker Training project administration for current operations information and reporting.

Application and Extension

The objectives of the TAT application and extension are to apply TAT approach to government contractor, private industry groups and manpower agencies willing to utilize current plant or laboratory facilities and skilled personnel to train target manpower populations for career job opportunities within their own operations and in other companies.

AEC CONTRACTOR SYSTEM - Work with AEC eastern contractors began in October 1971, when Training and Technology became an AEC Industrial Training Center for all eastern area contractors. The program was designed to utilize the present TAT facility to conduct comprehensive and coordinated training programs for eastern AEC contractors. During the 1972 year of operation, the program trained approximately 200 disadvantaged persons to meet AEC manpower needs. Objectives also include exploring and developing replication possibilities, giving the western part of the United States the highest priority. The Sandia Corporation in Albuquerque, New Mexico, is currently under study for possible development into a western training site. TAT services extend to the Functional Industrial Training (FIT) program in Paducah, Kentucky, where training is provided as an extensive activity of ISTT.

PRIVATE INDUSTRY - (1) TAT is currently involved in a unique experimental partnership with Standard Oil (Indiana)/State of Illinois for training and employment of disadvantaged as chemical technicians. Illinois Employment Security administrators formally suggested in 1971 that TAT use its experience to help develop "a manpower training model which might be applied by a variety of Illinois industries." The Standard Oil (Indiana)/State of Illinois partnership encompasses industry participation in trainee selection, curriculum development and financial support.

(2) As a result of recent federal and state safety requirements and increased mechanization of the deep-mining industry, a Southern West Virginia planning group formally requested the assistance of TAT staff in developing a proposed "McDowell Mine Technology Training Center" to meet critical employment needs in the region's coal industry. The partnership would involve Concord College of Athens, West Virginia, the Free State Training Association, the M and C Coal Company of Northfork, West Virginia, and various state agencies.

MANPOWER AGENCIES - (1) Community Career Education Resources project represents a part of TAT continuing work with State Vocational Education agencies in the interest of application or extension of TAT findings and experience in the utilization of industrial and community resources. It is focused on: (1) career guidance and orientation, (2) career exploration, and (3) career educational training.

Objectives are to develop a survey instrument and test it in two county areas which could be used elsewhere to build a Community Career Education Resources data bank. Such a bank would contain retrievable information concerning: (1) community resources (public and private) available and interested in participating in joint career education programs; (2) ways in which community organizations and institutions would like to be involved; (3) capabilities of interested organizations and institutions in relation to joint programs.

(2) At present TAT is working with Oak Ridge High School to provide selected, senior students with career type education opportunities in conjunction with their academic studies. Upon graduation, after about six

months' training from TAT, graduates will receive both high school and TAT diplomas. A pilot program for 20 Oak Ridge High School students was completed in September 1972.

(3) In cooperation with the Tennessee Department of Correction, TAT is exploring a program of instruction for selected public offenders. A pilot program for seven honor inmates was concluded in September 1972.

Upgrading in an Industrial Setting

Upgrading in an Industrial Setting is an experimentation and related research activity which is designed to assess existing industrial upgrading practices, develop and apply alternative methods to improve upgrading results and work for utilization of proven strategies for achieving improved upgrading results in the AEC contractor system.

A major objective will be to produce guides and procedures on how upgrading practices can be developed and improved in industry generally. During the course of project work, continuing attention will be given to the manner in which other employers and possibly manpower agencies can apply project findings.

Two phases are involved—Phase 1 has two steps: analysis of the upgrading practices of the Oak Ridge industrial plants and design of alternative methods of upgrading, and step two, experimentation with new patterns of upgrading. Phase 2 would be application and utilization of proven methods in the U. S. Atomic Energy Commission contractor system. Project activity would first focus on the AEC industrial complex operated under contract by Nuclear Division, Union Carbide Corporation in Oak Ridge, Tennessee, then be expected to be extended to other AEC contractor locations.

This project will operate under the direction of the Training and Technology program and would be managed in collaboration with a Coordinating Council of Southeastern University Manpower Research Centers and other interested parties during Phase 1. During Phase 2, other similar centers would participate as this activity moved to other AEC contractors across the nation.

New Developments

The idea of the establishment of a Regional Utilization Network (RUN) within Region IV is a natural outgrowth of ORAU/TAT's founding document, *Resources for Southern Manpower Development* (1965), which dealt largely with the institutional resources of the South significant to long-range manpower development. The major conclusions and findings remain valid at present and relevant to regional utilization, especially the conclusion concerning information and experience: "A tremendous quantity of valuable experience, research results, and human resource development information is available from many diverse sources which, if made accessible and fully applied to program planning and operation would save a great deal of time, effort and expense."

In the intervening years, manpower practitioners and agencies involved in human resource development in this region have many accomplishments. However, more effective application of resources, ideas and information to manpower development needs can contribute to our region's progress. Thus, ORAU along with others proposes that work on a Regional Utilization Network begin now.

The Regional Utilization Network for Manpower Research and Development with Region IV manpower agencies will be directed initially by those participating in securing increased utilization of findings relevant to the development of our region's human resources. The major long-term objective of RUN is to facilitate a more systematic utilization of existing manpower planning and operational information by: (1) providing for regular periodic exchanges between those with manpower development resources and needs and (2) establishing other activities required to achieve utilization goals. A fully operational network may require three to five years to accomplish.

The initiation of RUN and definition of its role will be accomplished during a year-long conference schedule of three meetings to be held in the summer of 1972, winter of 1972, and spring of 1973.

Movement toward RUN's objective will be accomplished by forming a network of manpower planners and administrators, R&D project leadership and appropriate university representatives in the eight states of Region IV. Linkage to relevant information from throughout the U. S. will be provided via national R&D personnel and others. An increase in the region's bank of manpower expertise could be one of many useful outcomes of this experiment in service to regional manpower administrators.

FUNDING

Dates & Agency	Industrial Skill & Technical Training	Research & Development
1972		
MDTA Funds (DOL & DHEW)	$1,142,000*	
AEC Contractors	$386,000*	
CEP's (Nashville & Chattanooga)	$155,472*	
DOL Office of Research & Development		$544,800

*Includes subsistence allowances.

PUBLICATIONS

"Manpower Research Visibility," in *American Vocational Journal*, 1972

Training and Technology: An Industrial/Education Partnership for Industrial Manpower Development, 1972

Proposals

AEC Industrial Training Center, Operational Plan, October 1972-September 1973

Manpower Experimentation Program, 1971

Survey of Post-Placement Experiences of TAT Graduates, 1972

Upgrading in an Industrial Setting, 1971

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